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"Affordable Naval Mine Warfare"

**Banquet Address of
Under Secretary of Defense for Acquisition and Technology
Dr. Paul G. Kaminski
to the
NSIA Mine Warfare Conference
Ft Myer Officer's Club, Arlington, VA**

June 11, 1996

I am really pleased to be with you this evening. I must admit that I have a strong sense of *deja vu* tonight—last month I had an opportunity to address another group of accomplished naval warriors: the submarine community.

As I told them, there are some advantages and disadvantages in addressing a subject—in this case, affordable naval mine warfare—when one has not had a great deal of personal experience in working with that community in the past. I have had some experience working with the airborne stealth community. Some of those experiences coincide, some don't. My sense is that it will be useful to share some of this experience base and talk about common issues tonight.

I'd like to start by sharing with you the story of the fisherman and the game warden. . .

One morning, they both went out to fish together. When they got to the middle of the lake, the game warden baited his hook and threw his line out.

Then the fisherman reached into a tackle box, pulled out a stick of dynamite, lit it and threw it into the water. . .

After the ensuing explosion, the fisherman took out his net and began retrieving the dead fish which were now floating on the surface of the lake.

The game warden couldn't believe what he was seeing. . . he composed himself and said "You can't do that—it's illegal!"

At this point, the fisherman pulled out another stick of dynamite, lit it, threw it in the game warden's lap and then said "*Are you going to just talk, or are you going to fish?*"

When it comes to meaningful support of the naval mine warfare mission, it has been my sense that it is easy to talk about why; harder to talk about how; and even harder to do. It's time to stop "just talking" and start fishing. In simple terms, it means acknowledging the threat is real and growing; developing a comprehensive, affordable mine warfare plan; and then staying the course in executing that plan.

From your perspective today and mine, I think this is a critically important time for naval mine warfare. Last summer, the Defense Science Board studied the investments necessary for 21st century military superiority. One of the major conclusions reach by the DSB was that sea mines pose a significant threat to 21st century forces.

The DSB observed that the US must be able to counter both the current and the emerging mine threat. Advanced mine technology continues to proliferate through foreign military sales of countries like Russia and the People's Republic of China.

The breakup of the Soviet Union, with its enormous stockpile—estimated at some 450,000 sea mines—has resulted in the potential widespread availability of mines. These range from the World War I vintage moored contact mine—a \$1,500 version caused \$96 million worth of damage to the USS Samuel B. Roberts (FFG-58)—to advanced vertical rising and rocket-propelled naval mines. In fact, 75 percent of damage to US Navy capital ships in the last ten years came from mines, two of which were WWI technology.

Since the Persian Gulf war, the number of mine producers and mine exporters has grown significantly. Today, there are 49 countries that possess mining capabilities. There are about 30 known sea mine manufacturing countries and 20 known exporters. Widespread availability of advanced electronics and sensors will allow mines to be significantly more sophisticated—and therefore more difficult to clear.

Tonight I want to talk about at least three pre-requisites that I believe are necessary to sustain an effective, yet affordable mine warfare capability over the long term—one that puts people in the mine producing business on notice that they are wasting their time. The first of these is an effective concept of operations—one that works through the full spectrum of conflict and threat environments. The second is development of compatible system architectures that leverage our investments in fleet and national system-of-systems capabilities. And third, following through on executing the programs to field that architecture.

The path ahead to securing an affordable mine warfare capability begins with the right concept of operations. Right in the sense that the CONOPS is matched to the needs of the post cold-War era. The mission is no longer an issue of "home port

breakout." It has expanded to support expeditionary force operations in the littorals—particularly in the shallow water and surf zones.

It also means that we need to leverage our national systems to keep track of mines and arsenals on land and then support what I would describe—in Army terms—as intelligence preparation of the battlefield... battlespace in Naval terms... by mapping, surveying, and then maintaining surveillance of the littorals and strategic "choke points." Knowing the battlespace means having mine countermeasures-oriented bottom mapping and environmental data bases, knowing the potential for buried mines and knowing the acoustic and magnetic propagation characteristics of a particular area.

In this regard, my sense is that our mine warfare community could benefit from the experiences of another community. We are in a period where I would ask you to open up your horizons to think about traditional mine warfare operations in another way. The novelist Graham Green once said that every now and then a time comes where a door opens and lets the future in. This is a time when I think it is appropriate to think about what is ahead. The paradigm of the past—"search and kill" by dedicated mine warfare forces—probably is not the paradigm for the future.

Mixing some of the principles of an organic capability to clear a passage through sea lanes with some of the principles of "surfing the net" is probably the right combination to think about for the future. We need to think about creating for our naval expeditionary force the same kind of picture that we are looking to put together today for other combat forces. In this way, I think you will achieve your objective of "in-stride breaching" or giving the force a capability to quickly acquire, detect, classify and destroy mines... like, as General Jones would say, "an automobile going over a speed bump."

Probably the most mature piece of this future vision is reflected in what we have in a fused picture for the air battle. We have today deployed a system such as AWACS which provides the complete radar picture of everything that is in the air over about a 300 square kilometer area. We have this data fused with various off-board intelligence sensors that, in many situations, can tell us not only what is up in the air, but what is the capability of the various platforms and even in some cases, what is the intent of the particular airborne platform. Imagine that kind of a fused picture of the air war and how valuable that intelligence picture is.

We are in the process of putting that kind of picture together today for the ground battle. We have a system named Joint STARS, that has just come back from a deployment in Bosnia. That system has provided us with the first overall picture of the ground battle in an entire theater. We have not put a complete picture together yet with Joint STARS data fused with the intelligence from other off-board sensors. We

have a moving target indication base, and the ability to use synthetic aperture radar both on-board and from off-board sensors like the Predator. We do not have the intelligence yet completely fused in this picture, but it is coming; it will be there within a couple of years.

The picture I would like you to think about is having that same fused picture of the battlespace that our expeditionary forces will be operating in as they carry out their assigned missions. It would mean possessing the ability to truly have what Admiral Bill Owens would call "Dominant Battlefield Awareness." I think we are on the path to begin to do that, but it requires some new thinking, some new approaches.

To exploit the product from wide-area sensors and other intelligence sources, we are going to have to do a better job of marrying advanced technology and employment doctrine—it is something that I do not believe has been given adequate emphasis in the past. We have traditionally underestimated the importance of developing the appropriate doctrine, the tactics for employment, the training, and the people using these technologically advanced systems.

If I look back to my own personal experience in the F-117 Stealth Fighter Program and as advanced and significant as the technology was, I think one of the major contributions we made in that program was the effort to understand the limitations as well as the strength of the technology; to develop the mission planning tools; and to employ the system so that the limitations weren't so apparent.

Our leverage was obtained by people--war fighters--doing things that weren't standard from a tactical and doctrinal standpoint. The real issue here I think, as we look ahead, is how we can do more with less where the measure is not simply in developing the best technology or even building the best equipment, but in getting this combination in the field and using it wisely.

To deal with this issue, we're running a Joint Countermine Advanced Concept Technology Demonstration. This ACTD, initiated in fiscal year 1995, is now into its second year. It is sponsored by the US Atlantic Command and executed jointly by the Army, Navy and Marine Corps Team.

This ACTD will explore an integrated command and control approach to countermine warfare, giving the Joint Task Force Commander full visibility of the mine threat and control of countermine operations by coupling together the Army's newly established Mine Warfare center—developed for operations in Bosnia--with the Navy's Mine/Countermine Command Center.

The objective is to demonstrate the capability to conduct expeditionary warfare with a "seamless" countermine warfare transition from deep water, through the

shallow water craft landing zone, across the beach and on to inland objectives. About a dozen novel systems—Navy, Army, and Marine Corps—are being evaluated within the ACTD. These systems, some of which are now in formal acquisition, address the key aspects of countermine warfare: surveillance, reconnaissance, sweeping, breaching, and clearing. Tomorrow, I understand that you will receive an in-depth presentation on the progress of this ACTD from the program manager.

The submarine and special operations community just completed a related, very successful ACTD to integrate submarines in the nation's larger system-of-systems C4ISR architecture. Last week, the USS CHICAGO took control of the Predator Unmanned Aerial Vehicle in a demonstration with Navy SEALs off San Clemente Island, California.

This effort is a significant first: it is the first example of a Predator vehicle and sensors being controlled from a Navy submarine. Some people in the submarine community have commented that "this is the most exciting thing that has happened in submarine warfare since the nuclear reactor." I agree with them—rather than having a 15 foot periscope, the submarine effectively had a 15,000 foot periscope.

The submarine was configured with a super high frequency 23 dB gain flat plate antenna, similar to that used for direct broadcast TV, except adapted for seagoing conditions unique to submarines. A SUN SPARC workstation was used for directional control of the antenna. A JDISS terminal was put on-board to insure a video re-broadcast at 32kilobits-per-second.

The scenario included a requirement to redirect a land-based Predator to identify an emergent littoral target, such as a Silkworm missile launcher. The Predator was directed to conduct target surveillance in order to plan a real-time SEAL insertion—including dynamic re-tasking and bomb damage assessment. The demonstration included control of the UAV from the submerged attack submarine at periscope depth from a range of about 100 nautical miles.

In this scenario, the team is able to conduct its ingress and egress, while the orbiting Predator can monitor for hostile force interference the mission and provide that information back in real time. This example really highlights the fact that Advanced Concept Technology Demonstrations are an effective, inexpensive means to evaluate the operational utility of mature technologies, and to determine if this is a concept we ought to apply more often. It also highlights the potential use of unmanned aerial vehicles as communications relays for remote mine hunting systems. My assessment is that ACTDs are—and will remain—an instrumental mechanism for moving mine warfare capabilities forward at a reasonable pace.

In addition to operations concepts that make sense, we must implement system architectures that make sense as well. This is the second pre-requisite for an affordable mine warfare capability. Just this morning, General Jones briefed me on the US Naval Mine Warfare Plan—it is an excellent start at a sensible architecture. I applaud the time phased near-, mid-, and far-term approach to move from dedicated mine warfare assets to an organic capability. It recognizes that no silver bullet exists for neutralizing the mine threat.

The remote mine hunting system with side scanning and forward looking sonar is a key part of the plan for giving surfaces ships an organic mine countermeasures capability. The main challenge here will be meeting the demand for over-the horizon mine reconnaissance capability. To do this we are going to have to make advances in the energy storage and propulsion technologies for unmanned undersea vehicles. For the time being, the contingency capability provided by the Remote Mine hunting Operational Prototype is a dramatic improvement over current capabilities.

Another important part of giving surface ships an organic mine countermeasures capability is the plan to provide fleet helicopters with a laser mine detection capability.

The near- and long-term mine reconnaissance systems capable of being launched and recovered from a Los Angeles (SSN-688)-class submarine will add a new covert capability dimension vital to littoral warfare. These systems—tethered and autonomous—must remain at the top of the priority list for unmanned undersea vehicles.

I think it is interesting to note in this age of high-tech wizardry. . . the important role that mammals—dolphins and sea lions—play in locating mines on the ocean floor. A similar situation exists with the need to use canines for detecting land mines. If the olfactory receptor region of a dog's nose were unfolded it would cover an area equal to one square meter; the human's by contrast would cover an area equal to six centimeters by six centimeters. The "dog's nose" is generally regarded as capable of sensing chemicals at the parts per trillion (ppt) level—still much better than the capabilities of our best machines. With similar performance by sea mammals, it is no wonder that the Mk 4 Mod 0 program—a program involving Pacific Bottlenose dolphins trained to attach neutralization charges to the mooring cables of buoyant mines—will be with us for a long time.

My sense is that the mine warfare plan requires some more definition of the approach for more thoroughly integrating mine countermeasures with the nation's system-of-systems architecture for C4ISR—Command, Control, Communications, Computers, Surveillance and Reconnaissance. One of the key architectural design trade issues here is creating a suitable open systems environment to provide a foundation for

the incorporation of future sensor and processing capabilities—that is, to provide the means to make affordable upgrades in the future.

I also think trades need to be made to look at the issue of what are the right on-board storage capacities for taking the information that is needed to accomplish the mission. Careful attention needs to be given to the amount of processing done on- and off-board existing platforms and to dealing with the communications links required to disseminate information from various off-board sensors; some carried on manned aircraft, some carried on unmanned aircraft, some carried on unmanned undersea vehicles, and some implanted in various environments within the battlespace.

This leads me to a third pre-requisite for an effective, affordable mine warfare capability: we must follow through on our planned investments. Right now the Naval Mine Warfare budget is about 1.4 percent of the Navy's total obligation authority. In the past, when mine warfare was considered a mission stovepipe—a community onto itself—it tended to loose the budget wars within the building. Now that we have undergone—as General Jones would put it—"this sea change" of thinking, there must be a commitment to make prudent investments in undersea warfare.

In the short term, there is a need to insert mature technologies to provide advanced capabilities at lower cost. However, like a fine wine, no technology should be inserted before it's time. I have seen too many cases where a major program comes to a grinding halt, waiting for the "bugs" to be worked out of an immature technology. Over the long term, a technology insertion plan is needed to guide investments and sustain a critical level of expertise in the technology associated with this design base.

In summary, I have shared with you three necessary conditions for sustaining an effective, affordable mine warfare capability—a concept of operations that provides commanders with a fused picture of the battlespace; a sensible system architecture that integrates organic mine countermeasure capabilities throughout the fleet; and a commitment to prudent investment in the acquisition of new capabilities.

It is my sense that the Department and the Navy are on the right path in all three areas—but there is more work to do. Our mine warfare systems need to be better integrated into an overarching system-of-systems architecture with "plug and play" sensors and a central nervous system.

It is important that we get this top level architecture right because as Winston Churchill once said about Americans: "The bigger the idea the more wholeheartedly and obstinately do they throw themselves into making it a success. It is an admirable characteristic—provided the idea is good." We owe the sailor and marine out in the fleet that good idea.

Naval mine warfare is a vital part of this nation's defenses. Thanks to many of you in the audience, we are well postured to meet the mine warfare challenges of the 21st century. You can be assured of the top-down commitment from the Secretary of Defense, from myself, from Assistant Secretary Douglass and the whole top leadership in the Department that we will keep it that way in the future.

Together we have an opportunity here to fish. . . not just talk.

Thank you all.